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(56) Documents Cited

GB 2327052 A GB 2321418 A GB 2298380 A
GB 2288137 A GB 2223425 A WO 90/15668 A
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(54) Abstract Title

Sealing gaps in motor vehicle bodies during painting

(57) A method of sealing a gap between body panels in a motor vehicle body to be spray painted e.g. between a door post and door, comprises attaching a conformable elongate open-celled plastic foam sealing member 1 to a static part 2 by an adhesive track 4 so that a first face 12 of the member is aligned with an adjacent body panel 13 and closing a moveable part 15 onto the member to compress the member and seal the gap, said member having a second face (16) at right angles to the first face 12, second face bearing the adhesive track 4 which track is spaced from said first face 12. The sealing member may have a cross-sectional shape which is substantially rectangular, with an adhesive track extending lengthwise of the foam member along one face, the track being spaced from both opposite edges of the face.

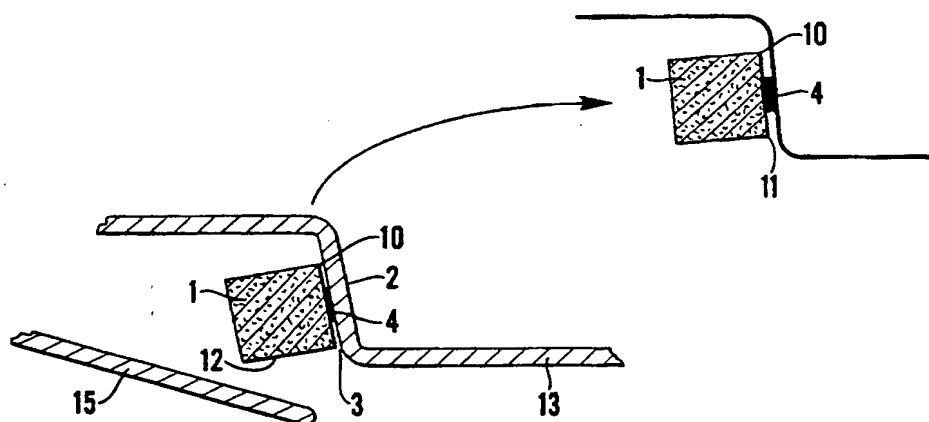


Fig. 1

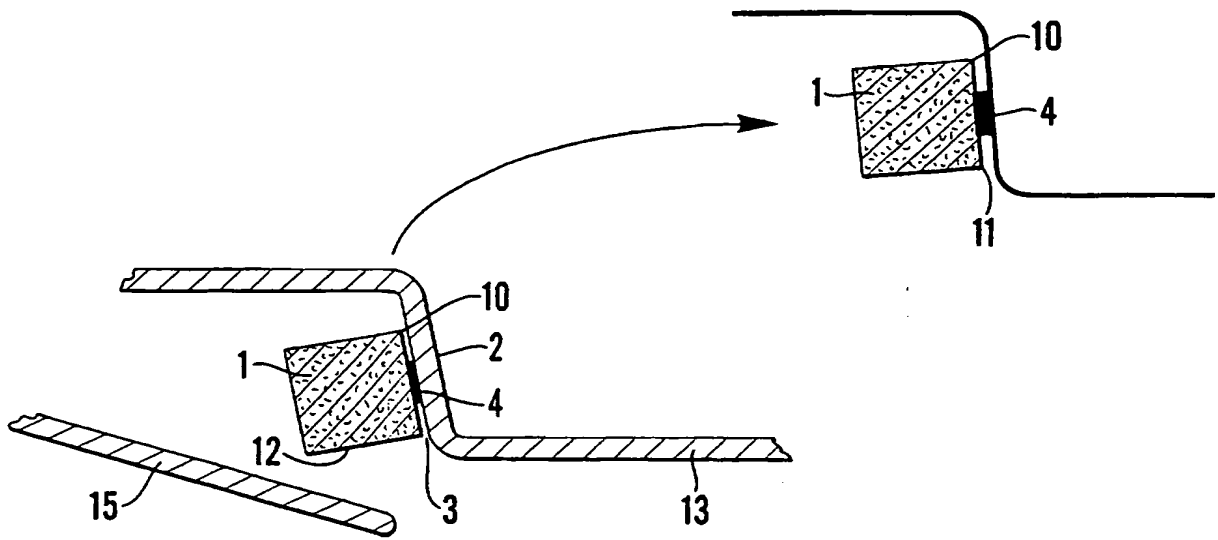


Fig. 1

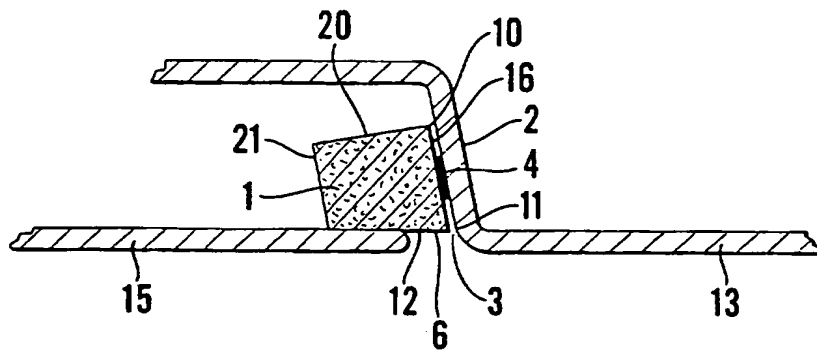
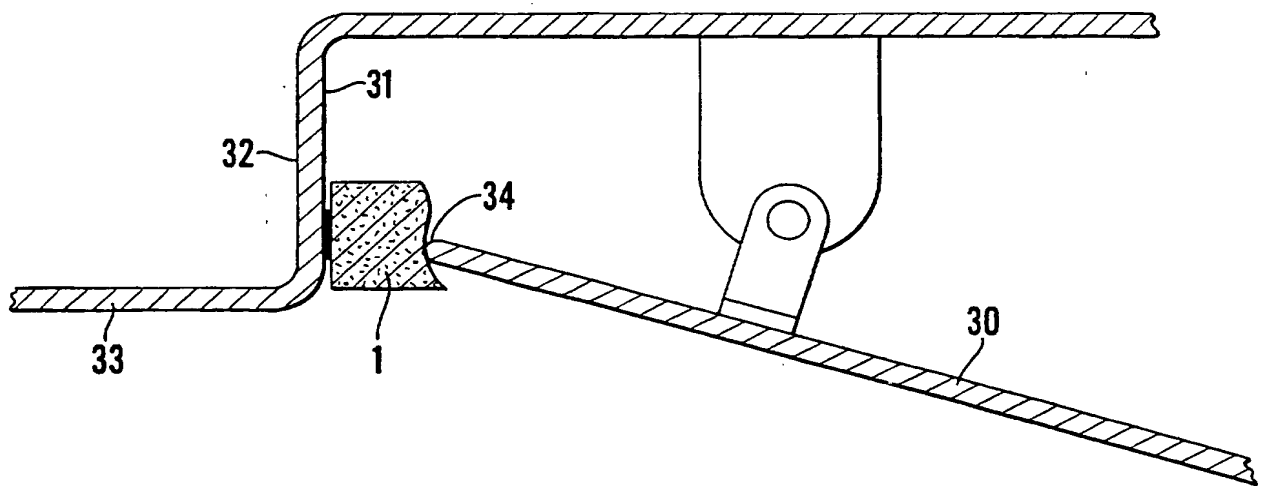
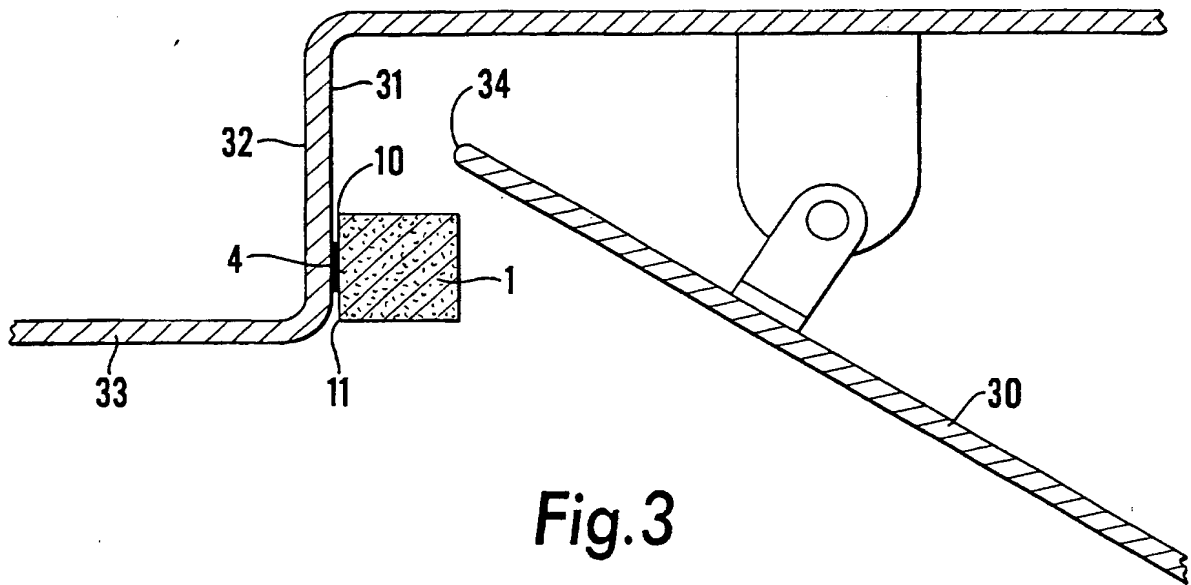
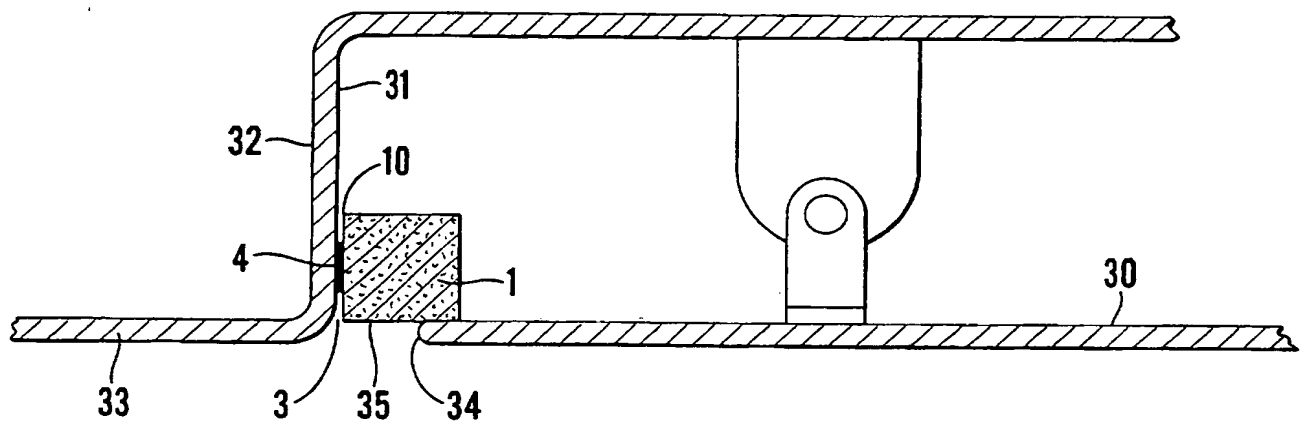


Fig. 2



*Fig.5*

METHOD OF SEALING A GAP IN MOTOR VEHICLE BODIES

This invention relates to a method of sealing a gap between panels in a motor vehicle body in preparation for applying paint spray to the vehicle. The invention also includes a sealing member for use in such method.

When carrying out vehicle body repairs or refinishing of motor vehicle bodywork, it is normally necessary to mask off the gap between adjacent panels in order to prevent overspray entering the gap between the panels.

Traditionally, masking tape and paper has been used for this purpose and more recently various foam strips have been proposed for simplifying the masking procedure. A number of these procedures involves attaching a compressible strip to a moving part such as a door panel in such a way that when the door panel carrying the compressible strip closes onto a static member such as a door post, a seal is made. While, in some cases, it may be necessary to attach the masking strip in this way, a degree of judgement is involved in such a procedure.

The present method provides an easier way of masking gaps between a static and movable member such as between the B or C posts of a motor vehicle and a front or rear door. The method of the invention is easier to carry out and makes use of a sealing strip which is simpler and cheaper to produce. At the same time, the method of the invention avoids the risk of a build-up of paint at the demarcation point delineated by an edge of the sealing strip.

According to the present invention there is provided a method of sealing a gap in a motor vehicle body between a first static part and a second, moveable part which is moveable between open and closed positions, said method comprising attaching a conformable elongate sealing member to the static part by an adhesive track so that a first face of the member is aligned with an adjacent body panel, and closing said second part onto the strip to compress the member and seal the gap, said member comprising an open-celled plastic foam and having a second face extending at right angles to the

first face, the second face bearing an adhesive track by which the member is attached to the static part and which is spaced from said first face.

The method of the present invention overcomes the problem of paint edge build-up by making use of an open-celled foam strip and also by providing an adhesive track which is spaced from the demarcation edge.

Preferably, the sealing member is substantially symmetrical in shape about a plane extending lengthwise of the member and passing through the adhesive track. The use of a symmetrical cross-section such as a rectangular or square shaped sealing member, enables the material to be used in the same way from either end. The adhesive track should also preferably be located intermediate between opposite faces of the sealing member and, more preferably, substantially mid-way between the opposite faces. This ensures that when the foam member is attached to the static part of the motor vehicle, there is no adhesive exposed in the region of the demarcation zone and the exposed face of the open-celled foam absorbs paint overspray, thereby preventing a paint edge from building up.

The invention also includes a sealing member for sealing a gap between body panels of a motor vehicle, said member comprising an elongate, conformable, open-celled, plastics foam having a cross-sectional shape which is substantially rectangular and has an adhesive track extending lengthwise of the foam member along one face, the track being spaced from both opposite edges of the face.

Preferably, the sealing member is of rectangular shape whose cross-section has a major dimension which is not more than twice the minor dimension. The most preferred cross-sectional shape is square.

The invention will now be illustrated by the following description and accompanying drawings, in which:-

Figure 1 is a section through part of the 'C' post of a vehicle frame, showing part of the open rear door, and a sealing strip adhered to the 'C' post;

Figure 2 is a view similar to Figure 1, except that the door is closed onto the sealing member;

Figure 3 is a section through a tailgate and surrounding bodywork with the tailgate in a partly open position, and the sealing strip of the invention adhered to the static part of the vehicle;

Figure 4 is a view similar to Figure 3 with the tailgate in a more closed position; and

Figure 5 is a view similar to Figure 4 with the tailgate fully closed.

Referring to Figures 1 and 2 of the drawings, the foam member (1) is of substantially square shape and has an adhesive track (4) which extends as a straight, single track lengthwise of the elongate sealing member (1). The track (4) is located substantially mid-way between opposite edges (10) and (11) of the member (1). The adhesive track (4) is a pressure-sensitive adhesive and the sealing member is adhesively bonded to the surface (2) of the 'C' post of the vehicle frame, with the outer face (12) aligned with the surface (13) of the adjacent body panel. Because of the location of the adhesive track well away from demarcation edge (3), between the body panel (13) and the sealing strip, there is no tendency for paint to build up at this edge.

Referring particularly to Figure 2, this shows the position with the door (15) closed onto the sealing strip. The sealing member (1) is made from a compressible, open-celled plastics foam and because it is positioned in alignment with the body panel (3), the closure of the door (15) onto the strip causes a slight deformation of the member and the attainment of a good seal. This may also cause the foam to lift slightly away from the portion (2) of the 'C' post, thereby providing a closed cavity (6)

within which paint may swirl. It is considered that the primary reason why there is little or no formation of a paint build-up at this demarcation edge, (or the edge between the outer edge of the door (15) and the foam) is the open-celled, absorbent nature of the foam surface (12), and the fact that the adhesive track (4) is spaced from the surface (12).

The provision of a rectangular or square section with an adhesive track generally mid-way between the outer edges of the sealing strip provides a sealing system which is capable of sealing 99% of gaps between static and moveable panels in motor vehicles. The symmetrical cross-section enables the strip to be fed from either direction and the right-angle between the face (16) bearing the adhesive and the outer face (12) enables the paint sprayer to place the sealing strip accurately in alignment with panel (13), without having to adjust it later.

The sealing strip of the present invention can also be used to seal panels which have a portion which opens inwardly. This is often the case where the 'A' post or a tailgate roof opening is to be sealed. This latter situation is shown in Figures 3 to 5. Referring to these drawings, the sealing strip is identical to that shown in Figures 1 and 2 and the same reference numerals are used to indicate equivalent parts. In Figure 3, the tailgate door (30) has been opened to permit the sealing strip (1) to be adhered to the face (31) of the static frame (32), in alignment with the face (33) of the adjacent panel.

Figure 4 shows the situation with the tailgate partially closed. The inner edge (34) of the tailgate deforms the foam of the sealing strip. Because the sealing strip is made from a soft foam, this contact between the tailgate edge and the foam merely deforms the strip but does not cause its position to be moved. As seen in Figure 5,

when the edge (34) moves past the sealing strip, the foam springs back and provides a seal at the gap (35).

The sealing strip is cheaply manufactured. It is preferably manufactured, for example, by cutting from a web or block of expanded foam to form a series of strips. Cutting from a web has the advantage that the surfaces on either side of the surface carrying the adhesive track are cut edges, thereby ensuring that the surface exposed to the paint spray does not carry any plastic skin. When foam is expanded through an orifice or die, the surfaces in contact with the orifice or die tend to form a skin. Even if the foam generally has an internal, open-celled structure, a surface skin can reduce the absorbency towards a paint spray. For best performance of the sealing strip, all surfaces should have an open structure free from any skin. This can be achieved, for example, by cutting the strip from a foam block so that all faces 12, 16, 20, 21 are cut surfaces free from any polymer skin. It is especially important that the face 12 is highly absorbent and therefore should preferably be a cut face. In the interests of reversibility of the sealing strip, face 20 should also be a cut face. It is also highly advantageous for the face 16 to be a cut, absorbent surface for two reasons. First, the area between the adhesive track (4) and the face (12) should be highly absorbent to absorb paint spray in this region. Secondly, the adhesive track adheres more effectively to an open-celled cut surface and this is particularly true of an adhesive applied as a hot melt. It is not essential that the surface (21) is a cut surface but for ease of manufacture, it is convenient for all faces to be cut from a foam block. Suitable plastic foams are flexible polyether, polyurethane and polyethylene foams are described in WO 96/26789.

The currently preferred foam material is an expanded, soft polyurethane foam having the following physical properties:-

<u>Physical Property</u>			<u>Range</u>	
			<u>Lower</u>	<u>Upper</u>
(1)	Density	(Kg/m ³)	30.0	38.0
(2)	Tensile Strength	(%)	100	500
(3)	Elongation at break	(%)	120	600
(6)	50% Compression Set	(%)	0.0	15.0
(7)	Cell Count	(per cm)	16	26
(14)	40% CLD Hardness	(kPa)	3.0	6.0
(23)	Clickability		2	2

One suitable foam is obtainable from Caligen Foam Limited, Broad Oak, Accrington, BB2 2BS, England.

The cross-sectional dimensions of the foam are preferably about 10-22 mm x 10-20 mm, typically about 15 mm x 14 mm. The adhesive track may be about 4-5 mm wide and may be located around the mid-point of one face, e.g. the narrower face where the cross-section is rectangular.

The foam strip will generally have a length which is sufficient to mask at least one door and preferably sufficient for masking a complete vehicle, e.g. about 2 to 10 metres. Normally, the foam strip will be supplied in roll form with or without an interleaving sheet of release paper, e.g. as described in WO 96/26789 and EPA-0384626,

The adhesive may be a pressure-sensitive adhesive applied from solvent solution or as a hot melt. WO 96/26789 may be referred to for details of suitable adhesives.

While the sealing strip of this invention has been described with particular reference to sealing a 'C' post or 'B' post of a vehicle, because of its softness and

flexibility it can also be applied to masking the roof/tailgate gap and the 'A' post gap. In all of these applications, the sealing element is adhered to the static member.

CLAIMS:-

1. A method of sealing a gap in a motor vehicle body between a first static part and a second, moveable part which is moveable between open and closed positions, said method comprising attaching a conformable elongate sealing member to the static part by an adhesive track so that a first face of the member is aligned with an adjacent body panel, and closing said second part onto the member to compress the member and seal the gap, said member comprising an open-celled plastic foam and having a second face at right angles to the first face, the second face bearing an adhesive track by which the member is attached to the static part and which track is spaced from said first face.
2. A method as claimed in claim 1 wherein said member is substantially symmetrical in shape about a plane extending lengthwise of the member and passing through the adhesive track.
3. A method as claimed in claim 1 or 2 wherein the member is generally rectangular and the track is located intermediate between the opposite faces of the member.
4. A method according to claim 3 wherein the track is located substantially midway between opposite faces.
5. A method according to any one of the preceding claims wherein the static part is a 'B' or 'C' post of the vehicle.
6. A sealing member for sealing a gap between body panels of a motor vehicle, said member comprising an elongate, conformable, open-celled, plastics foam having a cross-sectional shape which is substantially rectangular and has an adhesive track extending lengthwise of the foam member along one face, the track being spaced from both opposite edges of the face.

7. A member as claimed in claim 6 wherein the adhesive track extends along one face only.

8. A member as claimed in claim 6 or 7 wherein the adhesive track is substantially straight.

9. A member as claimed in any one of claims 6 to 8 wherein the adhesive track extends substantially midway between opposite edges.

10. A member as claimed in any one of claims 6 to 9 wherein the member, when viewed in cross-section, has a major dimension which is not more than twice the minor dimension.

11. A member as claimed in claim 10 which is substantially square in section.



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Claims searched: 1-11

Examiner: Richard Kennell
Date of search: 28 March 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.R): B2L (LCVA); B2E (EM)

Int CI (Ed.7): B05B 15/04; C09J 7/02

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,P	GB 2327052 A (JEVONS), 13 January 1999, see page 3 lines 14-16	6-8
X	GB 2321418 A (MERRITT), see Figures 2a-2c, 4, 4a, 5	6-9
Y	GB 2298380 A (WESTERN), see adhesive tracks 5, 6	1,5 at least
X	GB 2288137 A (MINNESOTA MINING), see page 2 lines 27-35	6-8
Y	GB 2223425 A (WESTERN), whole document	1,5 at least
Y	WO 90/15668 A (FRESCO LINE), see Figures 6-11	1,5 at least
Y	US 5260097 A (SILVESTRE), see Figures 3-4	1,5 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.